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Nutritional Management of the Dry Cow

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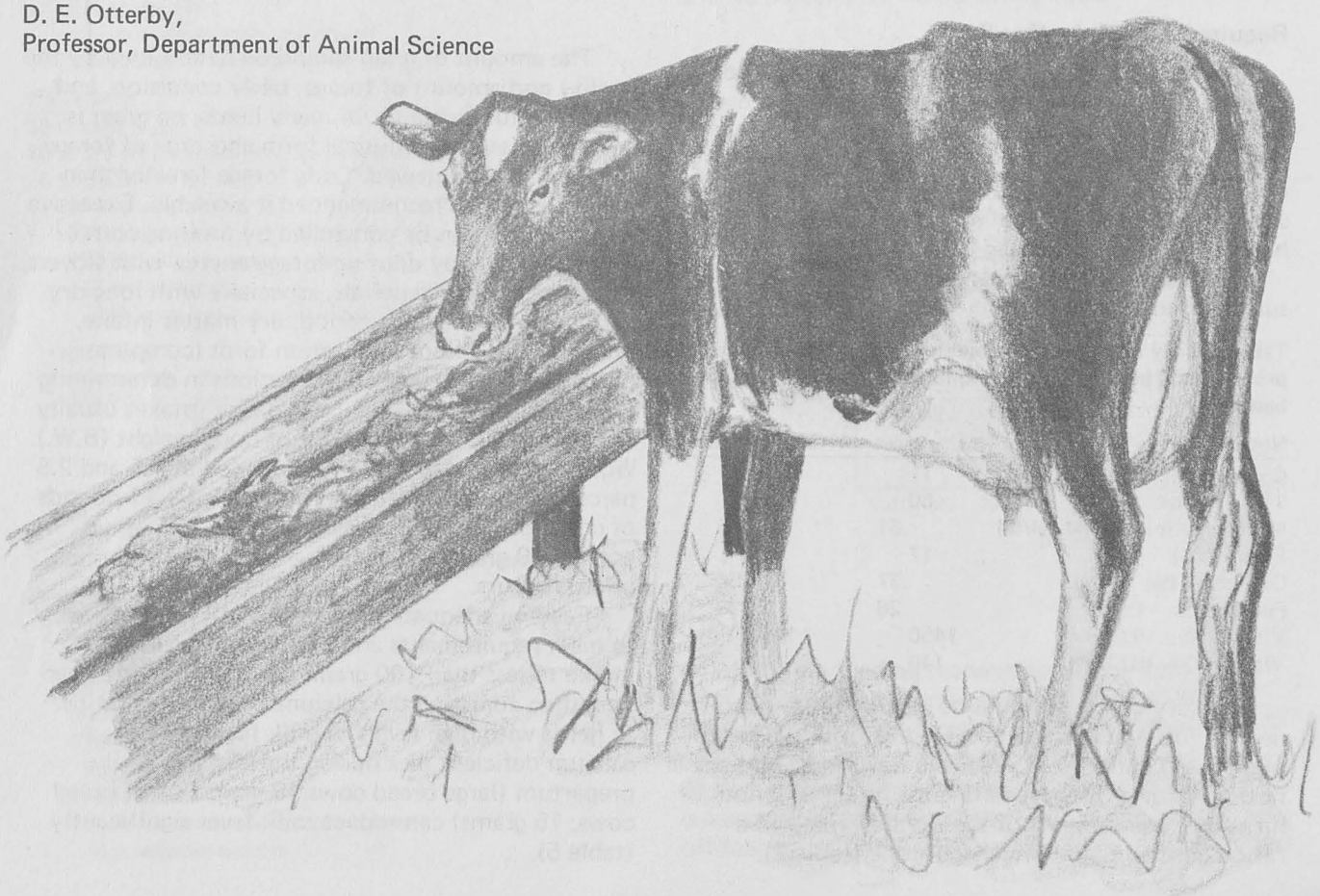

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Dairy cows are forced to make major metabolic and nutritional adjustments throughout lactation and gestation. The cow shifts from a low nutrient need for maintenance and fetal growth to high requirements for large quantities of milk in a short time period. Loss of profit and animals occur when dairy producers cannot control metabolic and nutritional disorders traced to the dry period and early lactation. Calving difficulties, retained placenta, mastitis, overfat cows, off feed, and reduced resistance to infectious disease are examples. A sound dry cow program and controlled transition to the milking ration can represent an extra 500 to 3000 pounds more milk per cow per lactation.

Requirements of the Dry Cow

The dry period was once considered a time for cows to rest, gain weight, and "stand still" (turned out with heifers and fed whatever was available). Recently, greater attention has been placed on the dry cow program due to an increase in fat cow syndrome, higher levels of milk production, and herd health problems associated with the dry period.

The nutrient requirements for the dry cow are summarized in table 1.

Table 1. Daily nutrient requirements of dry cows and cows producing 50 pounds of milk (expressed on a 100% dry matter basis)

Nutrient	Dry cows	Lactating cows
Crude protein (c.p.) – (%)	11	15
TDN – (%)	60	71
Net energy (n.e.) – (M-cal/lb)	.61	.73
Fiber – (%)	17	17
Calcium – (%)	.37	.54
Phosphorus – (%)	.26	.38
Vitamin A – (IU/lb)	1450	1450
Vitamin D – (IU/lb)	140	140

The dry cow requirements include those nutrients needed for maintenance and for the rapidly developing fetus. Young 2- or 3-year-old cows need additional nutrients for growth. Alfalfa-grass forage will not meet the requirements of the dry cow nor will a ration consisting of corn silage alone (table 2).

Table 2. Approximate nutrient content of typical forage programs (100% dry matter basis)

	Alfalfa-grass	Corn silage	½ Alfalfa-grass ½ Corn silage
Crude protein (%)	16 (+)	8 (-)	12 (+)
TDN (%)	50 (-)	70 (+)	60 (+)
Net energy (M-cal/lb)	52 (-)	70 (+)	61 (+)
Fiber (%)	34 (+)	26 (+)	30 (+)
Calcium (%)	1.01 (+)	.28 (-)	.69 (+)
Phosphorus (%)	.25 (-)	.21 (-)	.23 (-)

Plus (+) values are above minimum nutrient requirements.
Negative (-) values are below.

Coarse textured, low energy grain mixtures are desirable (table 3).

Table 3. Example Dry Cow Grain Ration

940 pounds of cereal grain
(oats, barley, corn and cob meal, bran, beet pulp, etc.)

40 pounds of calcium-phosphorus mineral
- legume forage (monosodium phosphate or commercial equivalent)
- grass and corn silage (dicalcium phosphate or commercial equivalent)

10 pounds of a vitamin A and D premix
- 1,500,000 units of vitamin A per pound of premix
- 500,000 units of vitamin D per pound of premix

10 pounds of trace mineral salt

The amount of grain should be determined by the quality and amount of forage, body condition, and growth status (table 4). In many herds, no grain is needed for energy. Physical form and type of forage should also be reviewed. Long forage (greater than ½ inch length) is recommended if available. Excessive energy intake can be controlled by limiting corn silage intake or by diluting forage energy with stovers, straws, or similar materials, especially with long dry periods. Length of dry period, dry matter intake, ration specifications, and ration form (complete rations) are important considerations in determining ration composition. Daily dry matter intakes usually range from 1.3 to 2.1 percent of body weight (B.W.). When a standard dry cow ration is fed at 1.5 and 2.5 percent of body weight, a difference of 1.11 pounds of crude protein, 6.5 megacalories (m-cal) of net energy, 29 grams of calcium, and 14 grams of phosphorus occurs.

Feeding adequate phosphorus (18 to 40 grams) to meet requirements and limitation of calcium intake to less than 100 grams per day are more practical than adjusting the calcium:phosphorus ratios. In herds with high levels of milk fever, feeding a calcium deficient diet during the last two weeks prepartum (large breed cows 19 grams; small breed cows, 15 grams) can reduce milk fever significantly (table 5).

Table 4. Sample dry cow rations*

RATION A
24 lb alfalfa hay**
6 lb grain mix
955 lb oats
955 lb ear corn
65 lb monosodium phosphate
25 lb trace mineral and vitamins

RATION B
24 lb grass hay**
8 lb grain mixture
975 lb oats
975 lb ear corn
25 lb limestone
25 lb trace mineral and vitamins

RATION C
56 lb corn silage**
1 lb grain mixture
1618 lb soybean meal
162 lb oats
171 lb dicalcium phosphate
23 lb limestone
25 lb trace mineral and vitamins

RATION D
20 lb legume-grass hay**
20 lb corn silage
3 lb grain
970 lb oats
970 lb ear corn
35 lb monosodium phosphate
25 lb trace mineral and vitamins

RATION E
30 lb corn silage
10 lb dry crop residue (straw, corn stalks, etc.)
6 lb grain
871 lb oats
871 lb ear corn
190 lb soybean meal
43 lb limestone
25 lb trace mineral and vitamins

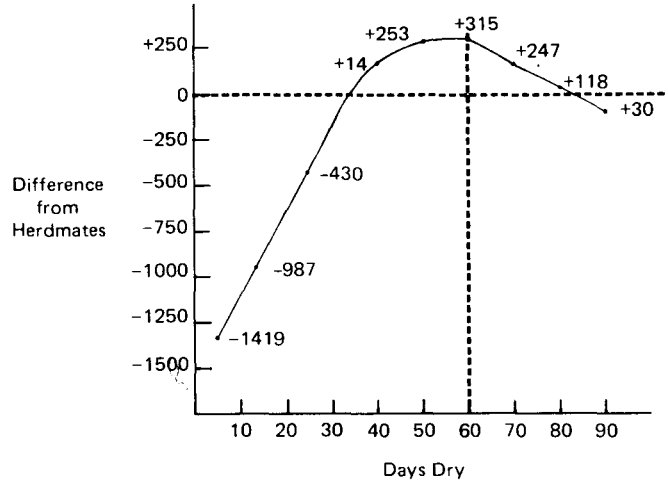
*1300 lb cow
**Forage quality: (100% D.M.) alfalfa hay (16% c.p., 44 m-cal, n.e.)
grass hay (10% c.p., 37 m-cal n.e.)
corn silage (8% c.p., 65 m-cal n.e.)
residue (5% c.p., 37 m-cal n.e.)
legume-grass hay (13% c.p., 41 m-cal n.e.)

Table 5. Composition of a low calcium supplement and diet

40 lb corn silage
2 lb beet pulp
8 lb supplement
500 lb shelled corn
300 lb oats
130 lb wheat bran
50 lb molasses
5 lb urea
10 lb monoammonium phosphate
5 lb vitamin premix

Another problem that may be linked to mineral feeding is retained placenta. Ohio research has reported reduced retained placenta with the injection of a selenium (50 mg. of sodium selenite)-vitamin E (680 IU of alpha tocopherol acetate) preparation 20 days prepartum. However, in a Wisconsin study cows receiving adequate selenium and vitamin E did not have a lower incidence of retained placenta. Selenium status should be considered before routine selenium treatment of dry cows (Ohio rations contain .02 to .04 ppm selenium).

Studies on length of dry period revealed that 60 dry days resulted in the highest milk production (see figure) in the next lactation expressed as difference from herdmates. In 1976, Minnesota DHI herds reported an average number of 62.3 dry days per cow. High (17,894 pounds milk), middle (14,525 pounds milk), and low herds (10,911 pounds milk) averaged 56, 60, and 67 days dry with 16, 23, and 35 percent of cows in these herds had greater than 70 days dry, respectively. Dry periods of less than 40 days do not allow enough time for udder involution while dry periods longer than 70 days can result in excess body condition. Body condition is best put on during late lactation rather than in the dry period. The overall efficiencies of converting feed to body tissue metabolizable energy was 61.5 percent for lactating cows and 48 percent for nonlactating cows.



Lead grain feeding recommendations have changed drastically in the last five years. Lead feeding (increasing grain intake up to 20 to 30 pounds of grain prepartum) has been discouraged since little or no benefit has been noted. Health problems increased (displaced abomasum, fat cow syndrome, and off-feed conditions). During the last two weeks before

anticipated calving, grain should be introduced into the ration to prepare the rumen microflora for higher grain diets fed during early lactation. A **maximum** of 1 percent body weight should be adequate. The grain in corn silage should be considered since it may contain 40 to 50 percent corn grain on a dry matter basis.

Other management considerations should be reviewed carefully since they can contribute to stress and metabolic disorders.

Drying up or off – If production is less than 40 pounds a day, stop milking. Above 40 pounds a day, milk intermittently, reduce feed, and limit water to reduce milk flow.

Mastitis control – Continue to dip teats for several days after milking stops. Dry treat selected quarters if mastitis is not a major herd problem, otherwise treat all quarters. Use an effective dry cow preparation according to label directions.

Calf survival – Insure that adequate vitamins (especially A and D) and trace minerals are provided. Inject 5-10 cc of vitamin A and D concentrate to the cow at drying off time and 1 to 3 cc to the calf at birth.

Udder edema – Avoid excessive grain and reduce salt intake. Prepartum milk may reduce severity by increasing blood flow through the mammary gland. Save the colostrum for the calf. Use diuretics under the direction of a veterinarian.

Fat cow syndrome – Feed a balanced ration to prevent excessive weight gains during the dry period. Limit weight increases to 200 pounds if cows are in good condition at drying off.

Milk fever (parturient paresis) – Avoid high calcium rations (over 100 grams per day) during the dry period. Milk-fever prone cows can be fed a specific calcium deficient ration 4 to 10 days before calving.

Twisted stomach (displaced abomasum) – Feed a minimum of 5 pounds of long forage. Avoid finely ground or chopped feeds. Complete feed rations are preferred when high levels of grain are fed. Control other diseases (mastitis, metritis, etc.) and metabolic disorders.

Cleaning (retained placenta) – Supplement with vitamin A (fed or injected) in cows without calving complications (twins, early birth, difficulty, etc.). Consult with a veterinarian or nutritionist before selenium supplementation is initiated. Avoid overweight cows.

Ketosis (acetonemia) – Gradually increase grain intake (1 to 2 pounds/day) after calving to avoid indigestion and off feed. Limit lead feeding. Use propylene glycol before cows are off feed. Avoid fat cows.

Deworming – Treat cows prior to calving to minimize effect in early lactation (peak milk and persistency). Wisconsin research reports 423 pounds more milk per cow per lactation compared to controls.

Management At Calving

If the dry cow program has been successful, few problems should occur at parturition. Fat cows appear to be more susceptible to metabolic disorders, off feed, infectious diseases, and increased retained placenta. A greater reduction in feed intake occurs in older cows (fourth lactation or more) than young cows during the last four days before calving. Both young and older cows show reduced fecal output, rumen movement, and rumen sounds at calving. Less digestive system movement plus decreased calcium available for absorption from the gut suggest calcium absorption immediately pre- and postcalving is important to calcium balance.

Recommendations

1. Separate dry cows from lactating cows.
2. Condition cows prior to drying off.
3. Dry treat all quarters on cows in herds with mastitis problems.
4. Avoid dry periods longer than 70 days.
5. Develop specific dry cow rations considering:
   - forage form (prefer long grassy hay).
   - grain level and mixture (energy concentration and carrier function).
   - keep calcium intake below 100 grams and phosphorus near 40 grams per day.
   - evaluate vitamin A and D and trace mineral status.
6. Control lead feeding (.5 to 1 percent B.W.).
7. Complete blended rations offer greater control of intake and ration specifications.
8. Deworming prior to calving with an approved product. Read labels carefully.
9. Increase grain intake after calving at a moderate rate (1 to 2 pounds/day). Be aware of total dry matter intake and forage:grain ratios.
10. Selenium supplementation may reduce retained placenta in selenium deficient areas.

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